EVALUATION OF STORE IMAGE WITH RESPECT TO THE VALUE AND WARMTH OF COLOR ON STORE SURFACE ELEMENTS

A Master's Thesis

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ABSTRACT

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This study examined the changes in value and warmth of color on store surface elements considering store image. To evaluate the store image, four different existing retail stores were chosen which had surfaces in red, green, yellow and blue colors which also referred four primary colors (red, green, yellow and blue) of Natural Color System (NCS) and these retail stores were manipulated through a 3D modeling program. Manipulated samples represented 20 per cent increased and decreased values as well as opposite colors of these four color hues. A questionnaire was used to understand whether changes in color made any difference on perception of the store image. The questionnaire consisted of 13 adjective pairs and a six-point semantic differential scale to evaluate manipulations in retail store samples in terms of prestigiousness and liking. Eighty Bilkent University students participated from different departments except design departments. According to results, value manipulations seemed to influence perception of store image. Differences in warmth of color had conflicting results with previous studies when prestigiousness was taken into consideration.

Key Words: store image, prestigiousness, color value, color warmth, surface elements, store environment, color perception

ÖZET

MAĞAZA YÜZEY ELEMANLARININ RENK DEĞER VE SICAKLIĞININ MAĞAZA İMAJI BAKIMINDAN DEĞERLENDİRİLMESİ

Seçkin Sağıroğlu

İç Mimarlık ve Çevre Tasarımı Yüksek Lisans Programı

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Bu çalışma mağaza imajı göz önünde bulundurularak mağaza yüzey elemanlarının renk değer ve sıcaklığını incelemiştir. Mağaza imajını değerlendirmek için aynı zamanda Natural Color System (NCS)'in dört ana rengini de (kırmızı, yeşil, sarı ve mavi) işaret eden kırmızı, yeşil, sarı ve mavi yüzeylere sahip var olan dört farklı ticari mağaza seçilmiş ve bu ticari mağazalar bir üç boyutlu modelleme programı aracılığıyla değiştirilmiştir. Değiştirilmiş örnekler yüzde 20 arttırılmış ve azaltılmış renk değerlerinin yanı sıra bu dört ana renk tonunun zıt renklerini temsil etmektedir. Renkteki değişikliklerin mağaza imajı algısında herhangi bir farklılık yaratıp yaratmadığını anlamak için bir anket kullanılmıştır. Anket prestijlilik ve beğeni göz önünde bulundurularak ticari mağaza örneklerindeki değişiklikleri değerlendirmek için 13 sıfat çifti ve 1'den 6'ya kadar anlam farklılığı gösteren bir ölçekten oluşmuştur. Tasarım bölümleri hariç farklı bölümlerden 80 İhsan Doğramacı Bilkent Üniversitesi öğrencisi katılmıştır. Sonuçlara göre, değer değişiklikleri mağaza imajı algısını etkiliyor gibi görünmektedir. Renk sıcaklığındaki farklılıklar prestijlilik dikkate alındığında önceki çalışmalarla çelişkili sonuçlar vermiştir.

Anahtar Kelimeler: mağaza imajı, prestijlilik, renk değeri, renk sıcaklığı, yüzey elemanları, mağaza ortamı, renk algısı

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CHAPTER 1

INTRODUCTION

Environmental psychology (environment-behavior research) is a multi-disciplinary field and association of environmental psychology, marketing, management, psychology, and architecture is helpful to explain retail store research which needs to be examined by different fields. For this reason, the verb “to sell” is beyond an action and much more complicated when retail stores are considered. A general description of the retail store might be stated as: retail store is a place where shoppers spend time and money. Indeed, it has a deep-rooted history and several characteristics. From the time that human beings looked for a place to live, work and recreates in different type of places are formed with respect to requirements.

Technology could be regarded as one of the most important factors which give human the opportunity to change the environment they live. Man starts to make living environments more functional to meet what they require. For instance, while trading is conducted in outdoor markets, after a while, the action ‘selling’ replaces in

enclosed spaces. This is how retail store characteristics begin to be improved. According to previous studies, a place compromises of different elements. The elements which are incident to architecture create an environment and this environment is perceived by its users: for retail store environments, they can be called as ‘shoppers’ and they may have different perceptions on a place. What makes them perceive a place in different perspectives might be clarified by some arguments. Personal differences, cultural differences, psychological impacts, educational background, age and sex differences could be just a few justifications for those arguments (Kotler, 1973).

Color is an important element with respect to its physical and psychological characteristics in retail store environments. While, some other elements such as texture, lighting, and layout may affect and manipulate the perception of a retail store’s value; color is also very influential to create an environment to reflect the image of a store and to determine quality of the store image. Various studies question the effects of color by comparing and contrasting methods. Wavelength, saturation (chroma), and brightness (value) differences become subtitles in scientific color research which have effects on perception, as well. Thus, perception of color is studied in psychology or environmental psychology for built environments. For instance, the way to understand how shoppers perceive the store image in accordance with differences in color may be explained by psychological responses of shoppers.

1.1. PAD Model

To understand psychological responses of shoppers Mehrabian and Russell (M-R) created a model to determine emotions within a framework: pleasure-displeasure, arousal-nonarousal, and dominance-submissiveness. This framework was called PAD (pleasure, arousal, dominance) model which gave meaning to emotions in the sense of three dimensions: a cycle of happiness (from unhappiness to happiness) with different stimulating emotion levels and directing feeling levels. They stated the importance of the model as: "Rather, a person is viewed as being in some emotional state at all times, a state that can be described as a region within a three-dimensional space" (Russell and Mehrabian, 1977: 274).

Afterwards, various adjective pairs were formed by the help of PAD model. Donovan and Rossiter used Mehrabian-Russell model for evaluation of retail store environments. This attempt was to understand an architectural fact through an environmental psychology model (Donovan and Rossiter, 1982: 34). They claimed that studies which have been conducted until that point do not question the perception of shoppers and they generally pay attention to physical characteristics of retail stores (Donovan and Rossiter, 1982: 36). Hence, Donovan and Rossiter used the model to have responses "as approach or avoidance behaviors" by Mehrabian and Russell (Donovan and Rossiter, 1982: 37). Basically, approach and avoidance behaviors examine an environment whether it affects feelings or not to "stay", to "explore", to "communicate", and to "perform and satisfy" (Donovan and Rossiter, 1982: 37).

Mehrabian and Russell's model provides guidance for numerous studies and their model is advanced by some other researchers. Russell and Pratt (1980) suggest another version to explain emotional responses which is called "two dimensions of emotion and eight major emotional states": arousing-sleepy, distressing-exciting, unpleasant-pleasant, and gloomy-relaxing (cited in Donovan and Rossiter, 1982: 38). Furthermore, Donovan and Rossiter advance M-R model and they present these pairs (1982: 44): contented-depressed, happy-unhappy, satisfied-unsatisfied, pleased-annoyed, relaxed-bored, important-insignificant, free-restricted, hopeful-despairing, stimulated-relaxed, excited-calm, jittery-dull, aroused-unaroused, frenzied-sluggish, overcrowded-uncrowded, wide awake-sleepy, controlling-controlled, dominant-submissive, and influential-influence. While these adjective pairs are suggested to evaluate the perception of shoppers, another group of adjectives are introduced to "measure environmental load factor" (Donovan and Rossiter, 1982: 45) which are enhanced version of Mehrabian and Russell's suggestion. Donovan and Rossiter introduce adjective pairs which measure environmental load factor as: usual-surprising, common-rare, familiar-novel, homogenous-heterogeneous, redundant-varied, similar-contrasting, symmetrical-asymmetrical, patterned-random, sparse-dense, continuous-intermittent, distant-immediate, uncrowded-crowded, small scale-large scale, and simple-complex.

The model is a guide for environment-behavior research and it is convenient to improvement. Dazkir and Read (2012) supported this idea with an instance: "All the other emotions are a combination of arousal and pleasure in varying degrees. For example, calmness is a combination of low level of arousal and high level of

pleasure" (p. 725). In brief, what Donovan and Rossiter' purpose is to combine adjectives in the model to generate new adjectives and pairs.

1.2. Adjective Pairs Used in Other Studies

To give examples to studies which measure the perception of respondents by models or adjective pairs like Mehrabian and Russell, Donovan and Rossiter; Baker et al. (1994) specified some points where prestige-image design differs from discount-image design. To introduce perception differences of shoppers in functional design factors of stores, especially color, proper adjective pairs were proposed. These pairs were supposed to answer variation of color, layout, and atmospheric factors with regards to perception of shoppers.

Likewise, Yıldırım et al. (2007) suggested eight bipolar semantic scales, because they tried to "measure the perceptual quality of a cafe/restaurant with yellow and violet interiors" to understand perception of shoppers about atmospheric attributes of retail stores by using these adjective pairs: roomy-cramped, high-low, pleasant-unpleasant, attractive-unattractive, interesting-boring, imposing-poor looking, calm-restless, and warm-cold.

By referring to Baker et al.'s studies on classifying retail stores (social, ambient and design factors), Sherman et al. (1997) offered some adjective pairs to measure the effects of store environment on emotions of shoppers and their influence on shopping behavior. The pairs were explained in two categories "Overall Image": good–bad,

negative–positive; (design factor) large–small, roomy–cramped, colorful–drab, unattractive–attractive, dirty–clean, comfortable–uncomfortable, cluttered aisles–uncluttered aisles, crammed merchandise–well-spaced merchandise, impressive interior–unimpressed interior, well-organized layout–unorganized layout, and "Organism Variables": (pleasure) happy–unhappy, bored–relaxed, unsatisfied–satisfied, pleased–annoyed, contented–melancholic, despairing–hopeful, (arousal) frenzied–sluggish, stimulated–relaxed, calm–excited, dull–jittery, and unaroused–aroused.

1.3. Aim of the Study

This study examines how prestigiousness of store image is perceived in respect with increasing and decreasing value of store surface colors. Perception of warmth of color scheme used in retail store surfaces is examined in terms of prestigiousness of store image. After reviewing the literature, a gap in the perception of value and chroma of color is specified. Although scientific color research has several studies on the issue, environment-behavior research generally mentions about hue or wavelength of color and perception of them in built environment. This study focuses on value differences in the perception of prestigiousness to suggest if hue changes affect the perception, differences in value (or chroma) of color can also have some effects on perception since color has these three dimension (hue, chroma, value) to be examined. Especially, using color in prestigiousness perception is very limited, so differences in value and warmth of color can enlarge this scope. Therefore, the aim of the study is to examine changes in value of surface color and warmth of surface color scheme and their relationship to perception of prestigiousness of store image.

According to generated research questions, the study has been formed. Any surfaces of retail stores such as walls, ceilings, shelves, display units, curtains, even chairs, armchairs and tables which are used in retail store environment were manipulated in 3D modeling program. To achieve that, Natural Color System was analyzed and its four primary colors were used since these colors corresponded with the colors in original samples. After a pilot study, the questionnaire was prepared for the main study to evaluate the manipulated samples. Consequently, results were analyzed with the help of computer based statistical software and statistical data were interpreted considering literature review.

1. 4. Structure of the Study

This study is structured in five chapters. The first one is introduction including structure of the study with a literature review. The second chapter is general description of retail stores and its environment with respect to retail store atmospheric effects and color as a design factor. Afterwards, prestigious store image is related to chapters mentioned before. The third chapter is study which will be analyzed in detail. Before the last chapter as discussion of the study, results of the study will be defined. The study will be concluded in the fifth chapter by giving some limitations of present research and directions for future research.

CHAPTER 2

STUDIES ON RETAIL STORES

Literature suggests that retail store design is associated with not only environmental psychology, but also environmental design to produce a store image, to satisfy needs of consumers in these environments (vanRompay et al., 2012: 2). One of the aims of environmental psychology is to improve and to establish a relationship between environments and users with the help of environmental design. They have a strong relationship and it often makes one's reason becomes one's result. Thus, retail stores should be analyzed in many aspects.

Kotler claims that "One of the mixed blessings of human history is that man increasingly lives, works, and plays in artificial environments" (Kotler, 1973: 49). Hence, human being always requires a shelter. In old times, men needed a shelter to protect them against nature. As much as living conditions got improved; to communicate with each other and to constitute a social community caused need of privacy, also. Thus, humans began to elaborate those artificial environments where

they live, work and play. Since ancient times, these artificial environments were shaped by different concerns such as religion, culture, science and technology. Each era contributed to its own innovations. Especially, architectural approach differs to create an environment; for instance, industrial revolution innovated in technology, especially new ways of producing materials had influences on architecture as well. With the revolution, mass production, comfort, functionality and the use of new materials become significant in architecture and design field. Consequently, all these changes appear in workspaces.

2.1. Today's Retail Store Environments

To create a functional space for retail stores is a necessity. Each and every day, millions of people visit and go shopping in different environments which leads a need of not only functional, but also attractive spaces to satisfy demands of these people.

Such spaces also can be called as "environment" or "atmosphere" and so on. Kotler was the first name that introduces the term "atmosphere" and "atmospherics" in literature. Moreover, he gives different dimensions to atmosphere. He technically explains atmosphere as "…the air surrounding a sphere. The term is also used more colloquially to describe the *quality* of the surroundings." (Kotler, 1973: 50). Besides that, he introduces the term "atmospherics" as an attempt to create more sensual atmosphere that can make demander to improve his buying potentiality (Kotler, 1973: 50). Kotler states four different sensory channels for atmosphere which are sound, scent, and touch (1973: 50-51):

The main visual dimensions of an atmosphere are:

- Color
- Brightness
- Size
- Shapes

The main aural dimensions of an atmosphere are:

- Volume
- Pitch

The main olfactory dimensions of an atmosphere are:

- Scent
- Freshness

The main tactile dimensions of an atmosphere are:

- Softness
- Smoothness
- Temperature

2.2. The Retail Store Image

Shoppers who are mentioned as demander before have the first impression about quality and price level of a retail store from the store environment or atmosphere. Therefore, the first impression is highly related to physical attraction which is related to surrounding atmosphere since physical attraction consists of color, texture, lighting, music and such elements. They can stimulate the five senses of shoppers to affect their choices in reference with Kotler's main visual dimensions given above.

All these elements create an image in shoppers' mind about that environment. In retail environments, retail store image is an issue which has various definitions. Firstly, Kunkel and Berry describe retail store image "as discriminative stimuli for an action's expected reinforcement: "Specifically, retail store image is the total conceptualized or expected reinforcement that a person associates with shopping at a particular store" (Kunkel and Berry, 1968: 22). Moreover, shoppers' previous experiences and their motivation is redirector to make shopper evaluate the retail store image either reinforcing or aversive. Besides, retail store image definition may be detailed as: "The overall form that this image will take depends on the respective value that the consumer places on store convenience, fashion and selection of merchandise, quality and quantity of sales personnel, and other such factors, plus the degree of reward and/or punishment incurred in connection with these factors" (Kunkel and Berry, 1968: 24).

Secondly, "The term "physical attractiveness" used in the Darden, Erdem, and Darden (1983)" as cited in Baker et al., which is a term to explain the relationship

between store image and store environment since physical attractiveness gives some basic clues about store image with design of store environments (1994: 329). In addition, Mazursky and Jacobsy's retail store image definition is: "A cognition and/or affect (or a set of cognitions and/or affects), which is (are) inferred, either from a set of ongoing perceptions and/or memory inputs attaching to a phenomenon (i.e., either an object or event such as a store, a product, a 'sale,' etc.), and which represent(s) what that phenomenon signifies to an individual" (cited in Baker et al., 1994: 328-329).

Thirdly, Porter and Claycomb explain retail store image with an initial description: "The concept of retail store image first came of interest when Pierre Martineau (1958) described the personality of the retail store" (cited in Porter and Claycomb, 1997: 374). Thus, retail store image is created by shoppers, but there are some factors that construct the image. Perception and feeling of shoppers are quite important while creating a store image: physical attractiveness and elements of the physical environment guide how retail store image is shaped in shoppers' mind. Retail store image formation is related with what shoppers perceive from environment of that store. Porter and Claycomb claim that "Retail image is generally described as a combination of a store's functional qualities and the psychological attributes consumers' link to these" (1997: 374). To support the assertion, they give a description additively "Retail store image is an overall impression of a store as perceived by consumers (Keaveney and Hunt, 1992)" (cited in Porter and Claycomb, 1997: 374).

Forthly, Bloemer and De Ruyter state that “Image is expressed as a function of the salient attributes of a particular store that are evaluated and weighted against each other. Therefore, we prefer to define store image as: The complex of a consumer’s perceptions of a store on different (salient) attributes” (1998: 501). They introduce eight elements which generate a retail store image: “location, merchandise, store atmosphere, customer service, price, advertising, personal selling and sales incentive programs (Bloemer and De Ruyter, 1998: 502). Several combinations of these elements are helpful to create advanced retail store images. In parallel with all these definitions, as an inference, what influences shoppers’ decision in retail stores are atmosphere and atmospheric elements, visible and invisible components of retail store environment.

2.3. Retail Store Factors

The retail store image definitions emphasize on the linkages between store image, store environment, service quality and merchandise quality and lots of environmental variables which have impacts on store image, store environment, service quality and merchandise quality are categorized by Baker in 1986: “ambient factors, design factors, and social factors” (cited in Baker et al., 1994: 330). According to this classification, store ambient factors consist of music, lighting and smell; store functional/aesthetic design factors have elements such as floor covering, wall covering, displays and fixtures, color, cleanliness, ceilings, dressing rooms, aisles, lay-out, and signs; store social factors are about how sales people behave and are dressed. To generalize, store ambient factors which are used in a store environment do not have direct influences on the perception of shoppers. Ambient factors refer to

anything which surrounds shoppers as concern of five senses and shoppers are not aware of them in retail stores as much as design factors. For instance, if a store is too cold or music is too loud in that store or there is bad smell in retail environment, shoppers might feel uncomfortable.

Store functional/aesthetic design factors can be directly observed and realized by the five senses. We may rename them as "store architectural factors". In contrast to store ambient factors, shoppers are completely aware of design factors and their impacts. The factor has some components which are layout of the store, furniture and furnishings, and anything related to the function of stores. For instance, if the layout of the store does not direct the shopper where he/she wants to go, shopper may perceive layout of the store as ineffective or complicated. Meanwhile, Baker et al. explain color in this category. They compare colors in prestige-image and colors in discount-image regarding retail environment and retail store image. They present a literature summary about prestige and discount-image and according to categorization; prestige-image should have pile carpeting; textured walls; decorated displays/fixtures; gold, silver, black, up-to-date, neutral/monochromatic colors on surfaces and a clean environment (Baker et al., 1994: 331). In prestigiousness perception, examining such characteristics may be beneficial.

As befits the name, store social factors are related to sales people and shoppers, more precisely, physical and psychological responses of sales people which may change impressions of shoppers positively or negatively. How sales people get dressed, their behavior and attitude, yet number of sales people is very effective on decision

making, choices, emotions and perception of shoppers. All factors need to be examined with respect to shoppers. Personal preferences of shoppers may differ. Nonetheless, a prestigious retail store image can be achieved by proper combinations of these store factors.

2.4. Color As a Design Factor In Retail Stores

In the literature, there are studies that find color directly affect the perception of store image. For instance, "the possibility exists that color may interact with other ambient characteristics and may alter consumer reactions to a store concept" (Babin et al., 2003: 542). Beside effects of color, some other atmospheric elements and combination of these elements are related to retail store image, also. "A store described as having a combination of bright, fluorescent lights (soft, incandescent lights) and popular (classical) background music causes consumer reactions consistent with a discount (prestige) image (Baker et al., 1994).

The effects of color should be analyzed in a broad sense. These effects may have different results in different fields. For instance, Belizzi et al. associate color with autonomic biological reactions, emotional responses, and obtaining attention (1983: 21). They prefer to analyze color in two titles regarding retail store research: approach orientation and physical attraction. Approach orientation is about color which draws attention and its latter effects. In addition, using color as a physical variable gives retailers some opportunities to catch the attention of shoppers;

however, exaggerated use of physical variables can cause irritation and discomfort for shoppers (Belizzi et al., 1983: 22).

While using color, it has to be known that there are various aspects to be considered. Belizzi et al. research and suggest three aspects of color: physiological, psychological and marketing color research.

2.4.1. Physiological Effects of Color

While examining physiological color research, brain and human body and their responses to a color can be considered. Belizzi et al. give various examples on the issue. By giving reference to Clynes and Kohn (1968), they underline that brain function is much more influenced by red rather than other colors although they have same intensity (1983: 23). In literature, such research are done by comparing opposite colors and color schemes Nakshian (1964) does, who find "the color red caused significantly greater hand tremor than green, and that speed of movement on a motor inhibition task was significantly faster under the red condition" (cited in Belizzi et al., 1983: 23).

2.4.2. Psychological Effects of Color

Colors have psychological effects on human being. Psychological color research also examines colors within some groups such as high wavelength colors – low wavelength colors and warm colors – cool colors. In the studies that have been

conducted before, researchers have similar results which are introduced by Belizzi et al. Firstly, in an example of a psychological research of color studies: "The color red is frequently described as active, adventurous, and stimulating, energetic, and vital… (Heline, 1979)" (cited in Belizzi et al, 1983: 25). Red is generally perceived as stimulus color which large companies widely use it such as Mc Donald's, Heinz, Coca Cola, Cnn or Toyota and so on. Secondly, Belizzi et al. state that "Yellow is often termed the "mind color," and is thought by some to stimulate the intellect. It is associated with cheer, gaiety, and fun (Sharpe, 1974)" which means the color yellow is stimulating as much as red, because red and yellow are figured in similar wavelength and scheme (cited in Belizzi et al., 1983: 25). Further, "Adjectives found to be associated with the color green are: secure, comfortable, calm, peaceful, serene… (Murray and Deabler, 1957), adjective for the color blue are indistinguishable: …a preference for blue is thought to indicate well-controlled emotions and behavior" (cited in Belizzi et al., 1983: 26). Additionally, they claim that especially the color red and warm colors are more up-to-date which also means more fashionable than cool colors as mentioned in the previous studies; however, shoppers indicate that cool colors used in retail environments are more attractive and more pleasant than warm colors (Belizzi et al., 1983: 38).

The issue is widely studied before. Some of the studies focus on comparison of hues, such as red vs. green (Elliot et al., 2007), violet vs. yellow (Yıldırım et al., 2007), high arousal colors (yellow, red, orange) vs. low arousal colors (blue, green, violet) (Vieira, 2010), red vs. blue (vanRompay et al., 2011) and so on. These studies are based on perceptual responses in general color research. Color preferences can be a matter of fashion. Especially, in perception of prestigiousness, color preferences are

described as ‘up-to-date’ and ‘fashionable’ in the previous studies. To avoid such conflicts, results of general color research are given with several examples. Results of previous research can guide this study. For instance, after reviewing literature, it is obvious that cool colors and low arousal color which are blue, green and violet are mainly preferred. The color blue is the most preferred color in general color research and these results may conduct this study.

2.4.3. Marketing Effects of Color

Marketing impacts of color create certain differences in advertising and retailing (Belizzi et al., 1983). Psychological effects of color also shape effects of color in marketing field. Categorizing colors according to gender (e.g. black for males, white for females) might be a good instance. Brands use color cautiously considering meanings that a color carries. For instance, “Simple colours are vibrant and intense as seen in traffic signs, Toys ‘R’ Us and McDonald’s, whereas sophisticated colours denote elegance and intimate communication as used by Laura Ashley, Armani, Tiffany and Jaguar” (Aslam, 2006: 25). With the help of the psychological impacts of color, some certain notions can be achieved in marketing. In addition, Belizzi et al. mention about the marketing in color research. It is proposed to take the advantage of “advertising and package design research in order to make retail design decisions (1983: 27).

2.5. Hue, Chroma and Value of Color in the Previous Studies

There are numerous studies to observe color research in different perspectives. For instance, Valdez and Mehrabian claim that "Color stimuli are characterized completely in terms of hue (i.e., wavelength), brightness or value (i.e., black-to-white quality) and saturation or chroma (i.e., purity or vividness, with lower saturation colors containing more grey)" (Valdez and Mehrabian, 1994: 396). While designing a retail store environment, if the head of design factors is color, these three characteristics of color should be considered. Whereas, long wavelength colors (red, yellow and so on) are found more arousing, Valdez and Mehrabian underline that the brightness and saturation of color and their psychological effects are not taken into consideration in retail environment studies (1994: 396). They research emotional responses of respondents after the changes in hues, chroma and value levels and different achromatic examples using Mehrabian's PAD model. They assert that there is a positive relationship between brightness (value) – saturation (chroma) and pleasure (1994: 398). Three relevant components (value- chroma- pleasure) and their connection may be explained as: "As expected, brighter and more saturated colors were associated with being more pleasant"; however, "The present results indicate that brightness had a considerably stronger effect than saturation on pleasure-displeasure reactions to color samples" (Valdez and Mehrabian, 1994: 398). Besides, "less bright and more saturated colors were more arousing" and "less bright and more saturated colors induced greater feelings of dominance in viewers" (Valdez and Mehrabian, 1994: 398-399). Especially, they draw attention for misleading perception of color hues by the reason of high saturation level of that hue: "…In fact, it is the high saturation of the red color samples used, rather than its hue, that accounts for the high levels of arousal observed" (Valdez and Mehrabian, 1994:

406). Evidently, hue, brightness and saturation of color should be analyzed elaborately in color research studies.

Ünver and Öztürk (2002) determine colors of buildings according to social-cultural, historical, environmental effects which are measured by the help of the Munsell Color System. Park and Guerin (2002) investigate color meanings in four different cultures by using harmonious color combinations like Ünver and Öztürk (2002). Four different color palettes are tested and they conclude that meaning and preference of color differ from culture to culture.

Ou et al. (2011) use three-color combination and they test it to understand its effects on harmonious/disharmonious feelings by using color wheels and interior images to evaluate the harmoniousness.

2.5.1. Hue Based Color Studies

In retail store environment, different perceptions might be observed by the manipulation of surface colors. The most known manipulation technique for colors is changing its hue from short wavelength (cool colors) to long wavelength (warm colors) or vice versa. Yıldırım et al., Bellizi et al. and separately Crowley have some studies which use that technique and they finally deduce that "Experimental research suggests that cool-colored store environments are preferred over warm-colored store environments" although previous studies testify that warm-colored environments are found more up-to-date which means modern, fashionable, and present (Yıldırım et

al., 2007: 3234). They have some supportive results for Belizzi et al.: “As a result, it has generally been concluded that blue environments evoke better feelings than do orange environments” (Yıldırım et al., 2007: 3234). They find that violet colored walls are perceived more positive than yellow colored walls when shoppers’ psychological responses are considered. On the other hand, as much as age gets increased shoppers become more critical about store characteristics. For instance, older shoppers’ response for physical environment of retail store is more negative while men are more positive than women.

In the meantime, Crowley research on wavelength of colors and as a result of the study: “Retail store environments in the more extreme wavelength colors (red and blue) were perceived as more active environments” (1993: 67). Crowley also claims that shoppers evaluated environments more positive which has wavelength moving from red to blue (1993: 67). In Crowley’s study, stimulating emotions is one of the titles and he asserts if shoppers’ emotions need to be stimulated, the color green should not be chosen in that retail store environment since it is located in moderate wavelength color. To create an attractive environment, especially for advertising purposes, blue (shorter wavelength) is found as the appropriate one (Crowley, 1993: 67).

Turley and Miliman introduce five variables of retail store image that define atmospheric stimuli which refer to Berman and Evans (1995) model of four variables: external, general interior, layout and design, point-of-purchase and decoration variables. Turley and Miliman improve the model and added a new title

as “human variables” which may be helpful to examine atmospheric stimuli of retail stores. They observe “color schemes” under the title of external variables (Turley, and Miliman, 2000: 194). Color is associated with physical attraction rather than approach behavior. Hence, influences of color depend on environment and merchandise.

Additionally, vanRompay et al. (2012) examines color, layout, and shopping intentions in common. As already mentioned, there are different elements which have impacts on shopping behavior, merchandise quality and buying decision. In their study, color and store layout are studied with shopping motivation. vanRompay et al. demonstrate when shoppers are task-oriented, they demand a roomy atmosphere. These shoppers keep their pleasure level lower (vanRompay et al., 2012: 15). Authors indicate that task-oriented shoppers are highly related to a goal, hence, retail environment color may not be one of their concerns but task-oriented shoppers prefer the store in blue color (2012: 15). However, recreational shoppers are pleased to shop in red colored retail environments with cluttered layout. vanRompay et al. (2012: 15) assert that “Taking note of these distinctions, the findings support the suggestion that task-oriented shoppers are primarily under the influence of spatial, function related design variables as they most clearly interfere with goal attainment” Additionally, these shoppers are found uninterested in diversity of atmospheric elements, since they mainly focus on how they are motivated.

The relationship between hue, chroma, value and also warmth of color is emphasized in many studies. For instance, Gao and Xin (2006) assert that “…hue is the dominant

factor on color emotions, these studies concluded that the meaning of a color comes mainly from its lightness and chroma and to a less extent from its hue with an exception for the "warm–cool" pair, which is dependent mainly on hue" (p. 411). As they claim, value (lightness) and chroma make color meaningful which cannot be ignored. Chroma and value based studies are significant to understand all aspects of color.

2.5.2. Chroma and Value Based Color Studies

Gao and Xin discuss color in several aspects such as lightness or value, chroma or saturation, hue and emotional response of color which was divided into two categories: "the experimental aesthetics of color or color preference" and "descriptive dimensions", in other words, color preference appraises some dimensions as "comfortable" or "uncomfortable", "good" or "bad" etc. (2006: 411). Descriptive dimensions are specified as "warm" or "cool," "light" or "dark", "heavy" or "light" etc. (Gao and Xin, 2006: 411). They claim that color preference is more individual; however, it shows similarity among people while descriptive dimensions "tend to concentrate on single dimensions such as, weight, distance, size, and temperature and hue values were deemed to have significant influence on these attributes" (2006: 412). Consequently, warmth of color is dependent on hue rather than chroma found to be more indicative (Gao and Xin, 2006: 417).

In another study, Grandjean (1973) orders advantages of light colors. Grandjean asserts that dark colors are depressing and dark colored places are generally quickly got dirty: "All light colours make life easier, brighter and friendly; they reflect more

light, brighten the room, and encourage cleanliness" (243). This study is conducted for residential environments, yet value of color (lightness) is considered and with some comparisons, it achieves valuable information for surface colors in retail store environments as well.

CHAPTER 3

STUDY

3.1. Objectives of the Study

As defined before, a retail store is perceived by shoppers and due to their thoughts and emotions they form the retail store image and prestigiousness is defined as “the fact or state of being above others in rank or importance” (Merriam-Webster on-line, 2013). Thus, this study examines how the prestigiousness of store image is perceived in respect to increasing and decreasing values of interior surface colors. Moreover, perception of warmth of color scheme in interior surfaces of retail was examined in terms of the prestigiousness of store image. In other words, the aim of the study is to understand the relationship between perception of the prestigiousness of store image, and changes in value and warmth of surface color scheme, as a design factor. To achieve this aim, any surfaces of retail stores such as; walls, ceilings, shelves, display units, curtains, even chairs, armchairs and tables which are used in retail store environment were manipulated.

The study uses manipulated photograph sets and a two-phased questionnaire. Photograph samples which have increased and decreased values and opposite hue samples to measure differences in perception of warm and cool color schemes used in the study. After specifying samples from photographs, they were drawn in 3D medium and rated by respondents using questionnaires. The questionnaire was firstly experienced in a pilot study which was done by ten interior architecture and environmental design students and after required modifications, it was repeated by 80 Bilkent University students who did not have architectural education.

3.2. Research Questions

Prior studies found that colors have influences on the perception of store image. As much as color affects retail store environment as a design factor, it is expected to influence the prestigiousness of the store image, also. Prestigiousness is discussed previously in various studies, and the relying on previous studies hypothesis and research questions of this case are presented below:

RESEARCH QUESTION 1: Do changes in the value of surface color affect the perception of prestigiousness of the store image?

RESEARCH QUESTION 2: Do changes in the warmth of surface color affect the perception of prestigiousness of the store image?

3.3. Method

In this study, value differences and changes in warmth of surface colors in retail stores and their effects will be observed to make inferences about perception of store image. To conduct the study, 3D modeling of different stores and a questionnaire will be used.

3.4. Materials

"SketchUp 8" and its rendering plug-in "V-Ray" were used to model existing retail stores in 3D form. Photographs of existing retail stores were manipulated in 3D form. All details in four examples were omitted to reduce clutter and to get a clear perception of changes in value and warmth of surface colors. First, value of surface colors were both increased and decreased 20 per cent to achieve an observable difference from the original ones to see whether shoppers' perception about that store image would differ in a positive or negative way. Beforehand, a pilot study was conducted to find out potential problems about the instruments. In the pilot study, it was found that when a 10 per cent change was applied, the two samples could not be differentiated by the respondents. Thus, in the main study, 20 per cent of increasing and decreasing was preferred in the main study. Secondly, two warm (yellow and red) and two cold (blue and green) colored examples were manipulated to understand whether changes in the warmth of surface colors would affect the perception of prestigiousness of store image or not. Photos taken from manipulated 3D models of the stores were displayed on printouts to participants, and then those participants were asked to complete a questionnaire. Participants of the study were chosen from

Bilkent University students who do not have an architectural background to reduce effects of educational background as has been mentioned before. Eighty students participated in the study. Participants of the pilot study were chosen from interior architecture and environmental design students in different classes. According to the results, some adjustments were made. Photos of the model were shown by portable computer with a HD LED screen (15.6"-R580) to those 10 students. Seventy per cent of the participants stated that photos need to be shown by printout rather than computer screen to make the questionnaire faster. Also, there were some conflicts on adjective pairs. For instance, “controlling-controlled”, “insignificant-important”, and “familiar-novel” were the adjective pairs which resulted in confusion and they were refined. Participants suggested that photographs of value differences should be displayed successively and percentage of value differences need be increased to understand the differences, as well. Taking into account these comments, questionnaire was simplified and photographs were reorganized in view of these comments (see Table A.1. and A.2.).

3.5. Selection and Manipulation of Photographs

At first, samples needed to refer to well-known brands, reach a wide number of people, bring an image with the name, and arouse feelings that participants would have no idea about the samples; which sample originally belong to which brand. The samples were reviewed via various web sites of brands such as Yves Saint Laurent, Dolce & Gabbana, Prada, Marc Jacobs, Louis Vuitton, Burberry, Armani, Versace, Ralph Lauren, Tom Ford, Gucci, Guess, Calvin Klein, Ferre and Fendi which have worldwide retail store chain with a sophisticated image and famous designer oriented

dress and accessorize shops. Manipulation of dress shop was a preference; hence, there were some example which would be compatible with goals of the study. The stores reviewed were represented signature of that brand with colors, lights, textures, materials, logos which creates an elegant atmosphere. On the other hand, for this study, chosen retail store environments should not give participants any clue about the brands and needed to be different from other retail stores of the brand in terms of physical characteristics. Thus, after reviewing all possible samples, four of them which are Yves Saint Laurent, Marc Jacobs, Louis Vuitton, and Prada were found the optimum samples to be manipulated according to Natural Color System (NCS).

Four different photographs were chosen to be manipulated according to four primary colors of Natural Color System (NCS). They were preferred since the examples had same colors with NCS's four primary colors which could make the study much more realistic. Consistency was shown in original sample colors to match with four primary colors: red, blue, yellow and green.

Natural Color System (NCS) is a system which was found in 1979 as "Swedish National Standard for Color" (Ncs Colour on-line, 2013) which has six elementary colors; yellow, red, blue, green and also black and white.

> The elementary colours yellow (Y), red (R), blue (B) and green (G) creates a colour circle. Black (S) and white (W) are located above and below the colour circle, creating a three dimensional space. Each colour in the circle represents hues. Each colour hue has many nuances consisting of whiteness, blackness and chromaticness. These three properties create colour triangles in which each nuance has its own distinctive place (Ncs Colour on-line, 2013).

NCS uses hue, chroma (saturation), whiteness and blackness (value) and some advantages on whiteness and blackness makes the system reason for preference. For instance, Nayatani (2005) claimed that evaluation of NCS is easier than Munsell value or CIE metric lightness (p. 296). Due to Nayatani's assertions, this system is greatly preferred in Europe. NCS has a double-cone and "NCS gives a systematic arrangement on color appearance, using the values of *w*, *s*, and *c*, together with hue. For this reason, it has been recognized useful in color appearance study and artistic color design field" (Nayatani, 2005: 296).

Figure1. Yves Saint Laurent Store, Las Vegas, by Stefano Pilati, 2008.

(Retrieved from; http://elitechoice.org/2011/02/08/stefano-pilati-designs-the-ysl-retail-space-in-las-vegas-in-the-opium-experience/)

Figure 2. Marc by Marc Jacobs, Milano, by Stephan Jaklitsch's, 2010.

(Retrieved from; http://www.solostyle.it/02042010/sephora-e-marc-jacobs-due-nuovi-store-a-milano/3313/marc-jacobs-milano)

Figure 3. Louis Vuitton, Santa Monica, by Valerio Architects and Interiors, 2010.

(Retrieved from; http://www.luxuo.com/events/louis-vuitton-santa-monica-place.html)

Figure 4. Prada, Paris, by Roberto Baciocchii, 2012.

(Retrieved from; http://www.verpan.com/projects/shops/prada)

To manipulate these samples in 3D form HSB (V) color system is preferred.

Photographs with the conversion tables and amount of modulation levels are listed:

Table 1. Color Red and Its Different Color System Responses

	RED	OPPOSITE RED
HSB / HSV	H:345° S:99% B (V):77% (-20&, +20%)	H:164.85° S:98.98% B (V):76.86%
RGB	R:196.35% G:1.96% B:50.56% Hex: #C40233	R:2% G:196% B:147% Hex: #02C493
HSL	H:345° S:98.02% L:38.89%	H:164.85° S:97.98% L:38.82%
CMYK	C:0 M:252.45 Y:189.34 K:58.65	C:252.4 M:0 Y:63.75 K:59

Source: http://colorizer.org/,

http://www.colorschemer.com/online.html,

http://www.colorpicker.com/,

http://www.colortools.net/color_complementary.html

Figure 5. 20% Increased Value Sample of the Color Red.

Figure 6. 20% Decreased Value Sample of the Color Red.

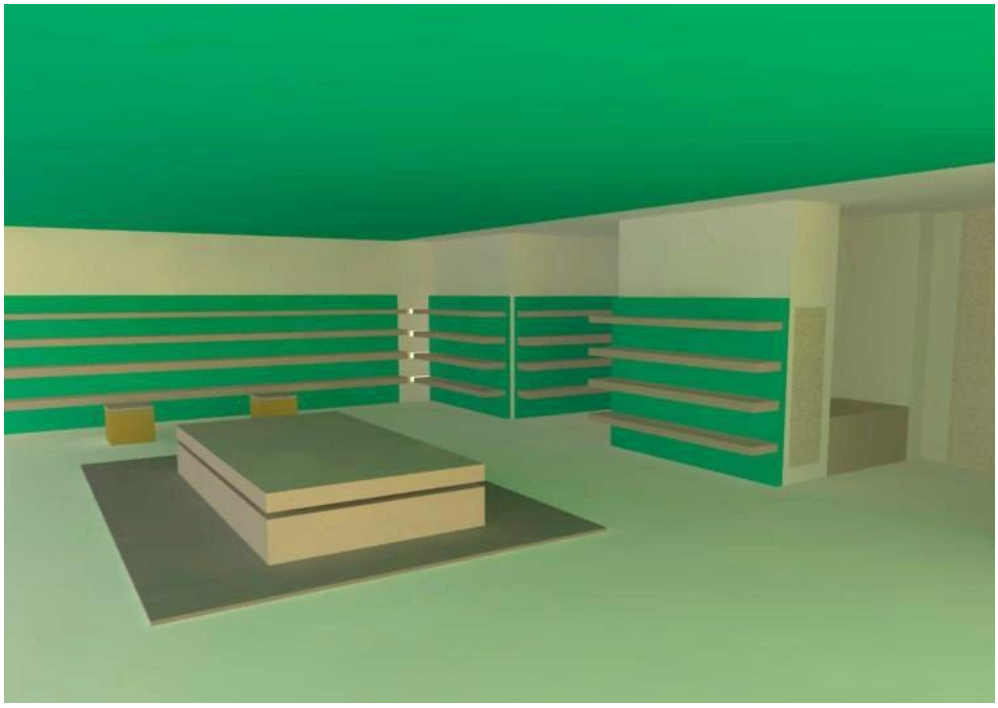

Figure 7. Opposite Sample of the Color Red.

Table 2. Color Blue and Its Different Color System Responses

	BLUE	OPPOSITE BLUE
HSB / HSV	H:197° S:100% B (V):74% (-20&, +20%)	H:17.14° S:100% B (V):74.12%
RGB	R:0% G:135% B:189% Hex: #0087BD	R:189% G:54% B:0% Hex:#BD3600
HSL	H:197° S:100% L:37%	H:17.14° S:100% L:37.06%
CMYK	C:255 M:72.25 Y:0 K:66.3	C:0 M:182.14 Y:255 K:66

Source: http://colorizer.org/,

http://www.colorschemer.com/online.html,

http://www.colorpicker.com/,

http://www.colortools.net/color_complementary.html

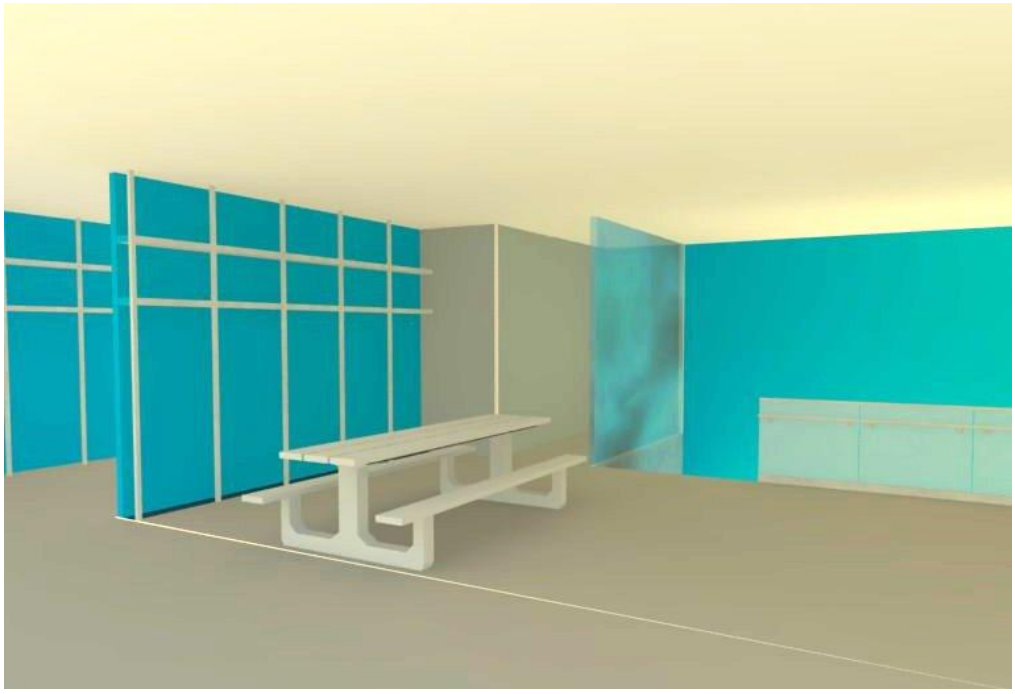

Figure 8. 20% Increased Value Sample of the Color Blue.

Figure 9. 20% Decreased Value Sample of the Color Blue.

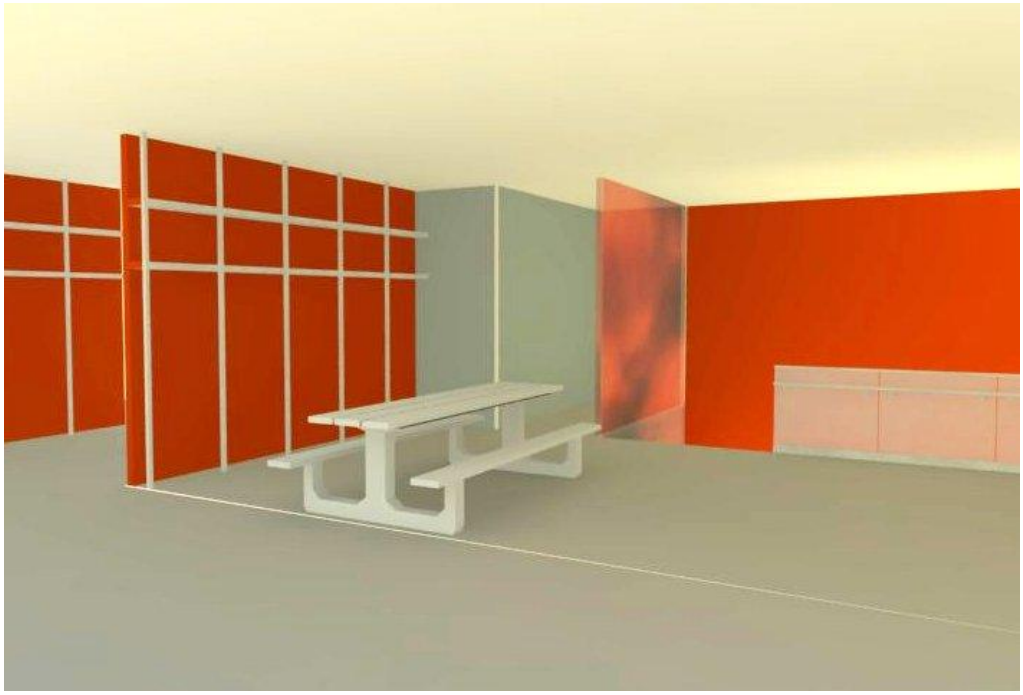

Figure 10. Opposite Sample of the Color Blue.

Table 3. Color Yellow and Its Different Color System Responses

	YELLOW	OPPOSITE YELLOW
HSB / HSV	H:50° S:100% B (V):80% (-20&, +20%)	H:230° S:100% B (V):80%
RGB	R:204% G:170% B:0% Hex:#CCAA00	R:0% G:34% B:204% Hex: #0022CC
HSL	H:50° S:100% L:40%	H:230° S:100% L:40%
CMYK	C:0 M:42.5 Y:255 K:51	C:255 M:212.5 Y:0 K:51

Source: http://colorizer.org/,

http://www.colorschemer.com/online.html,

http://www.colorpicker.com/,

http://www.colortools.net/color_complementary.html

Figure 11. 20% Increased Value Sample of the Color Yellow.

Figure 12. 20% Decreased Value Sample of the Color Yellow.

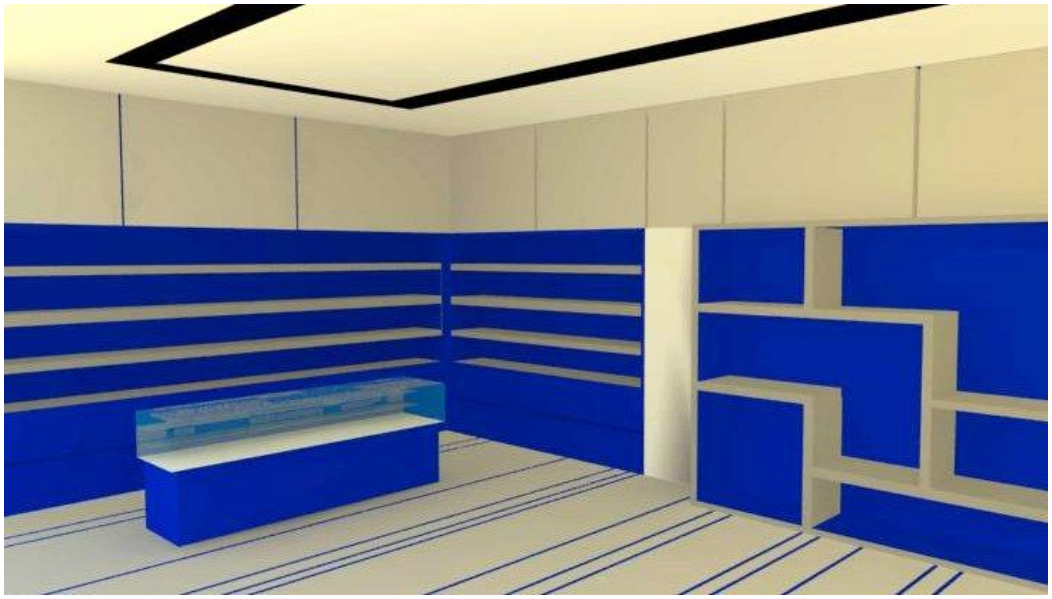

Figure 13. Opposite Sample of the Color Yellow.

Table 4. Color Green and Its Different Color System Responses

	GREEN	OPPOSITE GREEN
HSB / HSV	H:160° S:100% B (V):62% (-20&, +20%)	H:340.38° S:100% B (V):62.35%
RGB	R:0% G:158.1% B:105.4% Hex: #009E69	R:159% G:0% B:52% Hex: #9F0034
HSL	H:160° S:100% L:31%	H:340.38° S:100% L:31.18%
CMYK	C:255 M:0 Y:85 K:96.9	C:0 M:255 Y:171.6 K:96

Source: http://colorizer.org/,

http://www.colorschemer.com/online.html,

http://www.colorpicker.com/,

http://www.colortools.net/color_complementary.html

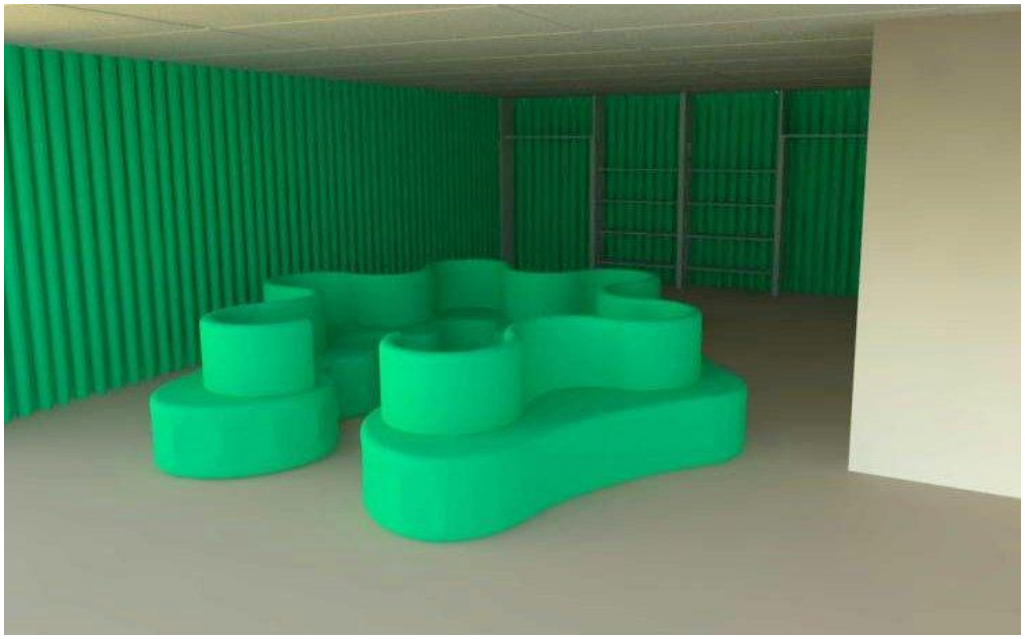

Figure 14. 20% Increased Value Sample of the Color Green.

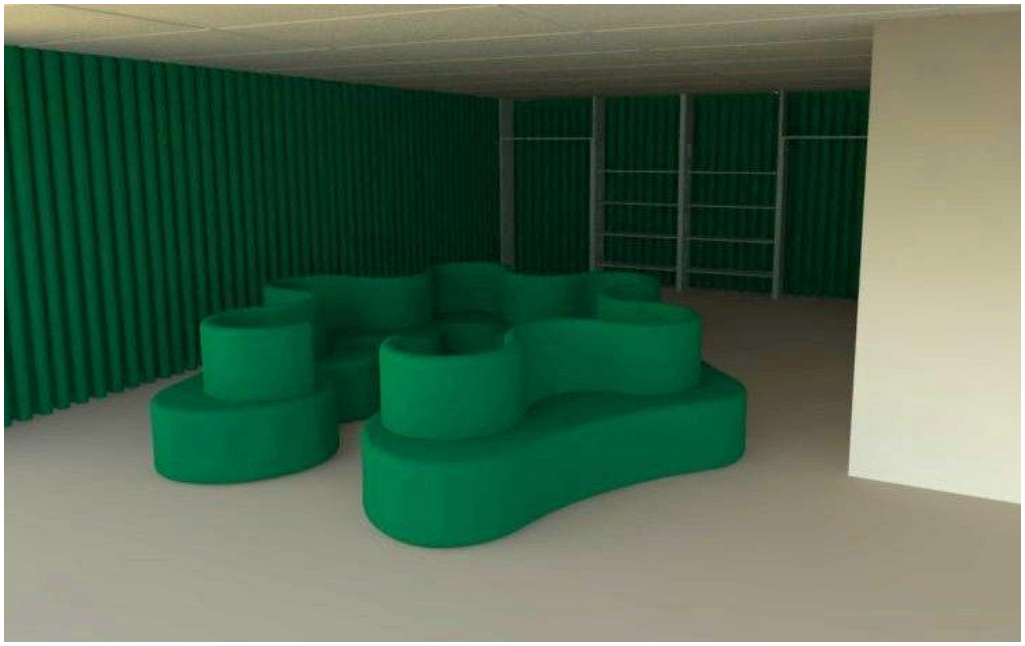

Figure 15. 20% Decreased Value Sample of the Color Green.

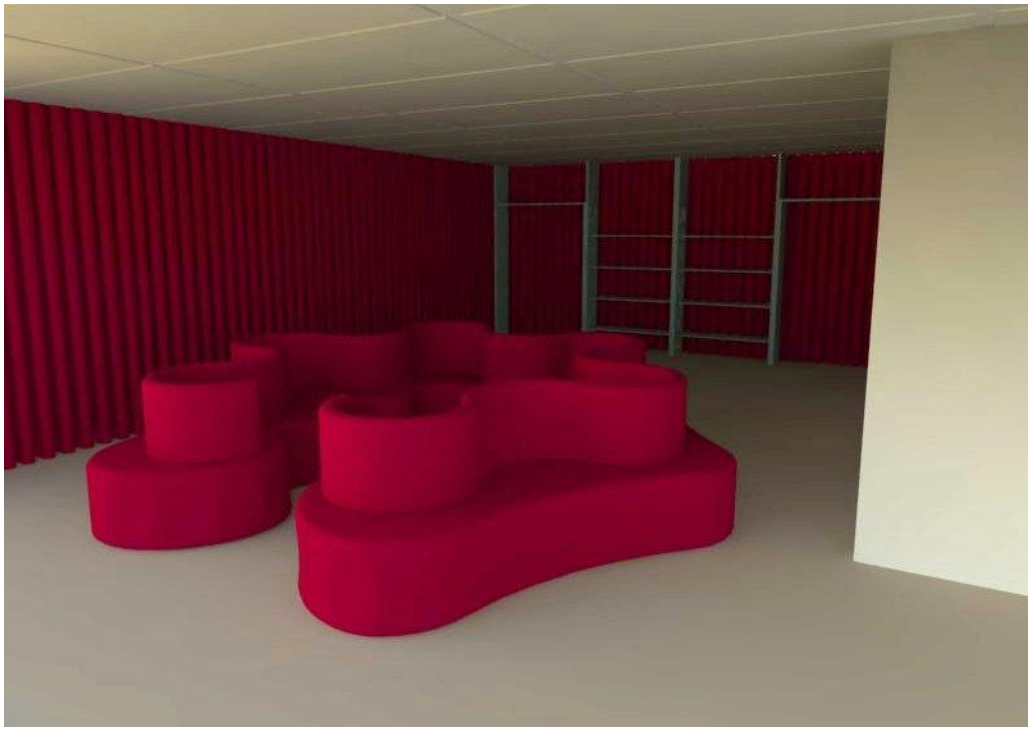

Figure 16. Opposite Sample of the Color Green.

3.6. Questionnaire Form

As has been mentioned, adjective pairs chosen from Mehrabian and Russell's PAD model was used. In this study thirteen adjective pairs were proposed because they were the most proper pairs for the aim of the study:

Group A measures how/ what retail store environment makes shoppers feel/ perceive the retail atmosphere:

(satisfied-unsatisfied) To examine what shoppers feel when they see manipulated photographs as a first impression. Different colors can lead different satisfaction levels since they are just variables in those atmospheres.

(stimulated–relaxed) Principally, "vivid" colored stores may make shoppers feel stimulated which are indicated in the study which is conducted by Baker et al. regarding prestige-image and discount image diversities.

(restricted-free) It is mostly related to layout of retail stores. As it is referred from Baker et al.: "A free-form layout (Burstiner, 1986) in the front area of the store operationalized the functional aspect of the prestige-image design environment", which gives shoppers an opportunity to feel free in the retail stores.

(unhappy-happy) It is quiet crucial that retail environment makes shopper feel happy or unhappy.

(calm-excited) Certainly, colors have different impacts and when they are used as a design factor in retail stores, they can stimulate emotions which are based on Mehrabian-Russell's semantic differential "arousal-nonarousal."

(unattractive-attractive) It can be claimed that prestigiousness perception is highly attached to attractiveness of the atmosphere. By using of different colors, perception of attractiveness can be alternated: "Underlining the importance of color in the retail context, Bellizzi et al. (1983) showed that consumers consider red (i.e., high arousing) retail environments unpleasant, tension-inducing, and less attractive compared with blue (i.e., low arousing) retail environments, arguing that high arousal colors may over stimulate buyers, thereby impairing purchase deliberations and buying decisions" (Baker et al., 1994).

(dislike-like) Examining how a general perception is formed towards to overall atmosphere.

Group B measures how shoppers evaluate the retail store environment:

(usual-surprising) Dated, vivid and declassifier colors cannot be an issue in prestigiousness perception of retail environments as Baker et al. assert before. This is why color may be a surprising variable.

(low quality-high quality) Questioning whether color affects the quality perception of that store or not.

(uncrowded-crowded) To find answers if color makes retail store to be perceived as they are crowded or chromatic color scheme is able to change such a perception or not: "Several studies have shown that crowded conditions that involved other customers in a retail store negatively affected their inferences", (Baker et al., 1994).

(cheap-expensive) Does color make retail store environment seem like cheaper or more expensive?

(old fashioned- fashionable) Color can affect retail atmosphere perceived fashionable or old fashioned since prior studies prove that dated and vivid colors are used in discount-image design although up-to-date colors are preferred in prestige-image design (Baker et al., 1994).

(cold-warm) To realize the differences between cold and warm color scheme with respect to prestigiousness perception of retail stores, this pair is chosen.

3.7. Procedure

The questionnaire was administered at two of Bilkent University's food courts, namely Speed and Kıraç; as well as Bilkent University Library. It was applied on six consecutive days in May, 2013 (5 weekdays and 1 day during the weekend), between 13:40 - 18.30. Eighty university students from different departments who did not have an architecture background participated in the survey. Convenience sampling was preferred to find respondents who were ready to participate in questionnaire became helpful to complete the study since content of it was heavily loaded for respondents. To limit participants and to control the study Bilkent University students were asked: 35 female and 45 male respondents agreed to participate in the study during six days, in same day time period and each respondent finished the questionnaire approximately in 15 minutes. The questionnaire consisted of pictures and adjective pairs (see Table A.1. and Table A.2.). As has been previously mentioned, eight different picture pairs were printed together (according to pilot study results and comments) however four contrast hue examples were printed one by one and they were shown participants in 15 different orders which was done by hand randomly. Adjective pairs are selected from previous studies and they were divided as A and B parts. Part A was designed for understanding how retail stores in the examples make participants feel with seven adjective pairs and part B was designed to examine how participants evaluate the retail stores with six adjective pairs. Thus, each picture was questioned by 13 adjective pairs which were located according to shown picture; when value samples were shown (13+13) 26 adjective pairs were given to respondents, when opposite samples were displayed to respondents only 13 adjective pairs were given.

CHAPTER 4

RESULTS of the STUDY

For factor analysis, reliability analysis, correlations and t-tests, Statistics Package for the Social Sciences (SPSS) 15.0 was used to analyze the data.

4.1. Verifications of the Manipulation of Variables in the Photographs Used for The Study

Firstly, to check if warmness and coldness were perceived differently, paired samples t-tests were conducted between the mean warmness ratings (M= 3.66, SD= .72) and coldness ratings (M= 3.31, SD= .64). They differed significantly in the predicted direction (M= -.356, t= 3.85, df = 79, two-tailed p = .00). Ratings indicated that warmness and coldness were perceived differently regarding store image which were shown in manipulated photographs found sufficient (see Table B.1.).

4.2. Factor Analysis of the Rating Data

Secondly, mean ratings of twelve stores which were manipulated by dark and light values of four primary NCS colors and their opposite colors were calculated. These

colors on surface elements considering the perception of store image were examined in adjective pairs for each of the 80 respondents.

Factor analysis was conducted to find the means of adjective pairs. According to correlation matrix, means of ratings for 13 adjective pairs were examined for 80 respondents. There were two groups of adjective pairs; the first group (group A) consisted of seven adjective pairs which questioned how stores made respondents feel and the second group (group B) consisted of six adjective pairs which questioned how respondents evaluated those stores to achieve overall means in 7-point scales. These thirteen adjective pairs were divided into groups of two: the first seven adjective pairs (group A) and next six adjectives pairs (group B) which were analyzed in groups.

In accordance with the results, three components, "Usual- Surprising" in Factor 1 and "Cold- Warm" in Factor 2 were loaded heavily on both factors. As the third factor “Crowdness Factor” could be assumed by 0.86 however it might be studied later which was also loaded heavily. But, “Crowdness Factor” was excluded from further analysis. Factor analysis had two factors as a result which were named as: F1: Evaluation and F2: Prestigiousness.

The first factor was named as “Evaluation Factor” and eight adjective pairs as items in this factor were; “Unsatisfied- Satisfied”, “Disliked- Liked”, “Unhappy- Happy”, “Unattractive- Attractive”, “Stimulated- Relaxed”, “Usual- Surprising”, “Restricted- Free”, and “Excited- Calm” with eigenvalue of 4.54 and accounted for 34.91 per cent

of variance. The second factor was named as “Prestigiousness Factor” and four adjective pairs as items in this factor were; “Old fashioned- Fashionable”, “Cheap-Expensive”, “Low quality- High quality”, and “Cold- Warm” with eigenvalue of 3.55 and accounted for 27.34 per cent of the total variance (see Table 5, Table 6, Table B.2.).

Table 5. Factor Analysis: Evaluation Factor

FACTOR 1	**EVALUATION FACTOR**
Unsatisfied- Satisfied	0.88
Disliked- Liked	0.77
Unhappy- Happy	0.75
Unattractive- Attractive	0.74
Stimulated- Relaxed	0.73
Usual- Surprising	0.62
Restricted- Free	0.61
Excited- Calm	0.56

Table 6. Factor Analysis: Prestigiousness Factor

FACTOR 2	PRESTIGIOUSNESS FACTOR
Old fashioned- Fashionable	0.88
Cheap- Expensive	0.85
Low quality- High quality	0.83
Cold- Warm	0.60

4.3. The Internal Consistency Reliability of the Rating Data

As mentioned above, two factors emerged from the factor analysis Evaluation Factor and Prestigiousness Factor. With respect to these factors, reliability test was conducted to understand variables which generated each factor were reliable or not. The first group of variables was: "Unsatisfied- Satisfied", "Disliked- Liked", "Unhappy- Happy", "Unattractive- Attractive", "Stimulated- Relaxed", "Usual- Surprising", "Restricted- Free", and "Excited- Calm" and their reliability considering Cronbach's coefficient alpha was found to be .909. After factor analysis, for the Factor 2 which was Prestigiousness Factor, variables were: "Old fashioned- Fashionable", "Cheap- Expensive" and "Low quality- High quality" and Cronbach's coefficient alpha was emerged as .923. As a conclusion, two groups of variables in each factor were quite sufficient and these items considered to be highly reliable (see Table B.3.).

4.4. Correlations between Main Ratings

Correlation presented the relationship between Factor 1 (Evaluation) and Factor 2 (Prestigiousness). Correlation of Factor 1, “Evaluation Factor”, was emerged as (M= 3.48, SD= .42) and correlation of Factor 2, “Prestigiousness Factor”, was calculated as (M= 3.71, SD= .56). Pearson Correlation emphasized a strong relationship between “Evaluation Factor” and “Prestigiousness Factor”. Results gave the value 0.63 which proved direct proportion of two factors (see Table B.4.).

According to correlation matrix table, adjective pairs emerged which were highly related. “Unsatisfied- Satisfied” and “Unattractive- Attractive” pairs correlated .73, “Stimulated- Relaxed” and “Unsatisfied- Satisfied” pairs correlated .66, “Restricted- Free” and “Unhappy- Happy” pairs correlated .66, “Unhappy- Happy” and “Disliked- Liked” pairs correlated .74, “Excited- Calm” and “Unattractive- Attractive” pairs correlated .50, “Unattractive- Attractive” and “Disliked- Liked” pairs correlated .85, “Usual- Surprising” and “Unhappy- Happy” pairs correlated .61, “Low quality- High quality” and “Old fashioned- Fashionable” pairs correlated .80, “Uncrowded- Crowded” and “Restricted- Free” pairs correlated .47, “Cheap- Expensive” and “Low quality- High quality” pairs correlated .81, “Old fashioned- Fashionable” and “Cheap- Expensive” pairs correlated .80, also “Cold- Warm” and “Unhappy- Happy” pairs correlated .69 (see Table B.4.).

The correlations suggest that attractive store environments made shoppers feel more satisfied and more excited, and they had tendency to like the store environments which were more attractive. The more shoppers felt satisfied, the more they felt

relaxed. The correlations between adjective pairs suggest that free store environments made shoppers happy and they evaluated such environments more surprising, warmer and they liked more. Due to the correlations, it may be supported that high quality store environments were perceived as more fashionable and more expensive while uncrowded ones were considered as restricted.

4.5. T-Tests of Cold- Warm and All Pairs

T-test analyzed adjectives as pairs; they were matched as light valued sample-opposite sample and dark valued sample-opposite sample with regards to two factors: F1 (Evaluation) and F2 (Prestigiousness). From the results it may be revealed that dark valued yellow-opposite yellow (bluish), dark valued green-opposite green (reddish) pairs were found to be strongly related for the Factor 1; dark valued yellow-opposite yellow (bluish), light valued green-opposite green (bluish), dark valued green-opposite green (reddish) were found to be strongly related for the Factor 2, since significance value was .000 for all results in those warm-cold comparisons. For value comparisons, yellow samples had the same results for Factor 1 and Factor 2, also. Light valued yellow was evaluated as the most positive color and found to be the most prestigious one. For evaluation factor, light valued blue, light valued red and light valued green came after it. Besides, light valued green-opposite green (reddish) pair had trend for the Factor 1, as similar as, light valued blue-dark valued blue pair for Factor 1. Mean differences indicated that dark valued yellow-opposite yellow (bluish), dark valued green-opposite green (reddish), dark valued blue-opposite blue (orange) samples for Factor 1; dark valued yellow-opposite yellow (bluish), light valued green-opposite green (reddish), dark valued green-opposite green (reddish) samples for Factor 2 and light valued yellow-dark

valued yellow sample for Factor 1 and also Factor 2 had significant differences which had a tendency to .005, also called as "trend" (see Table B.5.).

As indicated in the study, for value comparisons, yellow samples showed strong relationships with evaluation and prestigiousness. To review prestigiousness, it might be claimed that light valued yellow and green for value comparisons and opposite green (reddish)-dark valued green were found to be the most prestigious when results suggested that opposite yellow (bluish)- dark valued yellow, dark valued green-opposite green (reddish) pairs were found to be strongly related for the Factor 1: dark valued yellow-opposite yellow (bluish), light valued green-opposite green (reddish), dark valued green-opposite green (reddish) were found strongly related for the Factor 2, since significance value was .000 for all results in those warm-cold comparisons. Results of the study showed for prestigiousness factor (Factor 2) that opposite red (greenish) was evaluated more prestigious than dark valued red while light valued red was perceived better than opposite red just like other pair comparisons. Light valued yellow was evaluated more positive than opposite yellow however opposite yellow was more positive than dark valued yellow. Opposite yellow (bluish) sample which referred to cool color got the highest rating. Opposite green was evaluated more positive than light valued green, and opposite green was more positive evaluated than dark valued green when it was compared to light valued green unlike other comparisons for evaluation factor. Light valued blue was perceived more positive than opposite blue however opposite blue (orange) was perceived better than dark valued blue for evaluation factor, as well. To take prestigiousness factor into the consideration, it can be asserted that light valued red was more prestigious than opposite red (greenish), opposite red was more prestigious than dark valued red.

Besides, light valued yellow was more prestigious than opposite yellow (bluish), opposite yellow was more prestigious than dark valued yellow after dark valued green. Opposite green (reddish) was more prestigious than both light valued and dark valued green that it was the most prestigious color, especially, there was a quite difference in the mean of dark valued green and opposite green (reddish) which was followed by light valued green and opposite green (reddish). Finally, light valued blue was perceived as same as opposite blue (orange) (.00), which do not have any effects on the prestigiousness factor, opposite blue (orange) was more prestigious than dark valued blue (see table B.5.).

When examining prestigiousness (Factor 2) in value differences, it was understood that light valued yellow was conceived the most prestigious color. Light valued green was perceived less prestigious than light valued yellow however it was comprehended more prestigious than light valued red and light valued blue. Based on these results, it is obvious that light valued yellow had rated as the most prestigious rather than other colors.

CHAPTER 5

DISCUSSION

Changes in warmth and value of retail store surface colors and perception of store image were studied in the research. Differences in warmth of color were frequently experienced in various fields such as environmental psychology, marketing science, business and color research. Value of color was mainly studied in color research to understand its effects on perception and purchase behaviors of shoppers. The study suggested a way to demonstrate value differences for perception which is not detailed in environmental psychology research. In color studies, there are examples which examine the effects of hue, chroma and value of color; however, their effects in perception and behavior are generally overlooked.

The study examined whether changes in the value and warmth of surface color affect the perception of prestigiousness of the store image or not. Respondents rated retail store drawings. Previous studies suggest that real life settings are perceived almost the same way as drawings. Stamps (1990) claims: “Empirically, it has been found that responses to color photographs and slides are similar to responses obtained from perceivers located at the actual site from which the image was captured” (cited in Heft and Nasar, 2000: 302). In this study, from color photographs of actual site,

perspective drawings were obtained. Likewise, Stamps (1993) uses some 2D and 3D drawings of a residence to understand whether preferences change or not. As a result, different models evaluated similarly. On the contrary to common belief, drawings are not deceptive in evaluation or preferences.

Besides, details in those drawings are quite important. Excessively given clues in drawing can cause bias. Manipulated environment in drawings may enable 'behavior possibilities'. İmamoğlu (2009) claims that people have behavior possibilities which direct their actions according to place. As much as people know about a place, that place reduces unexpected actions. For instance:

> Other examples include studies which show that people can make judgments about the personal characteristics of occupants of houses by looking at drawings or photographs of house façades (Cherulnik and Souders, 1984; Cherulnik and Wilderman, 1986; Nasar, 1989); and one that shows people can make judgments about other people's personality traits and occupational statuses from their photographs taken in different residential settings (Cherulnik and Bayless, 1986) (cited in İmamoğlu, 2009:157).

To avoid bias, previous experiences and conditioning, in this study, manipulated retail store drawings were preferred. Since the research measured perception, it was very crucial to eliminate distractive or indicative evidences of manipulated retail stores such as: sold product, texture, lighting, or signboards.

The study aimed to answer two questions. The first one was: "Do changes in the value of surface color affect the perception of prestigiousness of the store image?" T-test analyses showed that light valued samples were evaluated more positively than dark valued samples. In the literature, value (brightness) of color had stronger effect

than chroma (saturation) on pleasure level (Valdez and Mehrabian, 1994: 398). In the literature, yellow which was more positively evaluated one of the long wavelength colors (red, yellow and orange), long wavelength colors were also found to be more arousing (Valdez and Mehrabian, 1994: 396). Light valued yellow was the most preferred color in both evaluation and prestigiousness factors. Light valued blue, red and green were very similarly. Nevertheless, results might be interpreted with reference to Valdez and Mehrabian's findings that state: "less bright and more saturated colors were more arousing" and "less bright and more saturated colors induced greater feelings of dominance in viewers" (1994: 398-399). Especially, they drew attention to misleading perception of color hues by the reason of high saturation level of that hue: "…In fact, it is the high saturation of the red color samples used, rather than its hue, that accounts for the high levels of arousal observed" (Valdez and Mehrabian, 1994: 406). Evidently, chroma and hue are more related to each other while value of color stands apart.

As it has been mentioned before, the color "yellow" is stimulating like red since red and yellow are figured in similar wavelength and scheme (Belizzi et. al., 1983: 25). If red was stimulating within its different values like yellow, the perception of prestigiousness would be similar to that view. Light valued yellow was perceived as the most prestigious one, but light valued green came after light valued yellow. In the literature, "Adjectives found to be associated with the color green are: secure, comfortable, calm, peaceful, serene… (Murray and Deabler, 1957)" (cited in Belizzi et al., 1983: 26), which were effective for green hues while yellow was claimed to "associate with cheer, gaiety and fun (Sharpe, 1974)" (cited in Belizzi et al., 1983: 25). According to the results, light valued green was found exciting while as similar

as it was mentioned above. The color yellow, was stimulating some feelings which are happiness and surprising, green was giving relaxation as reason of preference (Belizzi et al., 1983: 25). As Valdez and Mehrabian underlined before value (brightness) of a color should be considered, which was not included in retail environment studies before like chroma (saturation) of colors. Thereby, it is comprehensible how value, chroma and hue of a specific color might differ in respect of perception.

In addition, literature suggested a relationship between value – chroma and pleasure. However, Valdez and Mehrabian suggested that "The present results indicate that brightness had a considerably stronger effect than saturation on pleasure-displeasure reactions to color samples" (1994: 398). In this study, by supporting previous view, light valued samples were evaluated more positive than dark valued samples. Especially, light valued yellow the most positively rated color. In another study, Grandjean (1973) said "It is generally true that all dark colours have a depressing effect; they also make it more difficult to keep places clean. All light colours make life easier, brighter and friendly; they reflect more light, brighten the room, and encourage cleanliness" (p. 243). Grandjean's (1973) argument is congruent with the results of the study: light valued colors were rated more positively than dark valued colors. Dull, dark and lightless colors did not arouse any interest. Although Grandjean's (1973) research has directions for domestic environments, it may be beneficial for retail environments. Grandjean (1973) claimed that yellow, red and blue are exhaustive colors for eyes when they are used on walls and as time progresses people might not feel comfortable in these rooms (p. 244). Either a possibility to spend more time to examine retail store drawings would make

differences in results, especially highest rating for light valued yellow, or not; warm colors were described as stimulating (Grandjean, 1973:244) like several studies done before as in this study.

The second question was: “Do the changes in the warmth of surface color affect the perception of prestigiousness of the store image?” Results of the study showed that opposite yellow (bluish) sample which referred in cool colors was judged as the most positive example for evaluation factor. Due to its wavelength, an expected result was obtained since studies done before give same results on the issue as it has been referred before.

The warmth of color shows difference in the perception of prestigiousness. By comparing warm and cool colors, difference emerges clearly. Thus, a warm color (opposite green- reddish) was found as the most prestigious sample. In literature review, it was claimed that merchandise in (except price and quality of merchandise) warm colored atmospheres, especially red environments were perceived more up-to-date (Belizzi et al., 1983: 38). It is understandable why opposite green (reddish) was evaluated the most prestigious one; however, opposite yellow (bluish) as a cool colored sample rated as prestigious after opposite green (reddish) which was a warm colored sample. It may be supported by Belizzi et al. (1983) once again: they claimed that warm environments were found negative and also colorful. Bright and warm environments were perceived as tense. These stores also found to be unpleasant. Belizzi et al. (1983) underlined that warm colored environments were perceived brighter than cool ones in previous research. Besides, Aslam (2006) asserts that cool colors on some surfaces and cool colored environments are helpful for purchase

decisions: “Conversely, cool colours (blue and green) go well with the display and are more appropriate when customers face tough purchase decisions” (p. 25-26). Even though, Aslam’s study indicates that cool colored displays are preferred; Baker et al. (1994) mention that displays need to be ‘disguised/decorated’ for prestige-image characteristics of retail store. It is understood that why respondents found opposite green (reddish) sample as the most prestigious sample; however, opposite yellow (bluish) sample was evaluated as the most positive sample which corresponds to Aslam’s study.

Babin et al. (2003) find that “color-price interaction affected store patronage perceptions. The nature of this interaction suggests that consumers react positively to low prices when stores have a blue interior compared to an orange interior” (p. 549). It is compatible with Aslam’s view; respondents have ‘greater shopping and purchase intentions’ in blue retail environments (Babin et al., 2003, p.549). Because of increased purchase intentions, blue colored environments can be conceived as prestigious; however, the study suggested a warm color (opposite green-reddish) as the most prestigious color. As Aslam’s study, Babin et al.’s study might be supportive for evaluation factor in prestigiousness perception, because blue sample (opposite yellow-bluish) was rated as the most positive environment.

Red environments were mentioned as the brightest ones before which support opposite green (reddish) sample being judged as the most prestigious one, although there were clear red interior examples. Although there were negative comments on warm colored environments in terms of prestigiousness perception, results of this study may be helpful for a new point of view. Despite Bellizzi et al. (1983) asserted

“red (i.e., high arousing) retail environments unpleasant, tension-inducing, and less attractive compared with blue (i.e., low arousing) retail environments”, during decision of prestigiousness results were constituted in total opposite understanding.

Belizzi et al. and Crowley’s studies that “Experimental research suggests that cool-colored store environments are preferred over warm-colored store environments” although previous studies testify that warm-colored environments were found more up-to-date which means modern, new fashion, fashionable, and present (Yıldırım et al., 2007: 3234), likewise, Belizzi et al. asserted that “shoppers indicate that cool colors used in retail environments are more attractive and more pleasant than warm colors” (1983: 38). Yıldırım et al. found that cool environments were found to arouse better feelings than warm environments like several researches done before. In this study, results also indicated that a cool environment (opposite yellow- bluish) was perceived more positive than examples which included some other warm and cool environment samples.

According to results attractive store environments made shoppers feel more satisfied, more excited, and they had tendency to like the store environments which were more attractive. Participants rated as much as they felt satisfied, they also felt relaxed. For value comparisons, yellow samples showed strong relationships with evaluation and prestigiousness. To review prestigiousness, it might be claimed that light and dark valued yellow and green, and also their opposite colors were rated as the most prestigious samples and results showed that light valued yellow-opposite yellow, dark valued green-opposite green pairs were found strongly related for the Factor 1 (Evaluation); dark valued yellow-opposite yellow, light valued green-opposite green,

dark valued green-opposite green were found strongly related for the Factor 2 (Prestigiousness).

In the meantime, based on the study, free store environments made shoppers happy and they found such environments more surprising, warmer and they perceived more positive. High quality store environments were perceived as more fashionable and more expensive while uncrowded ones were considered as restricted.

5.1. Limitations of The Study

This study presents retail environment manipulations and a questionnaire which is conducted to understand the effects of these manipulations. To achieve a remarkable difference in value manipulations of color, a standard percentage is helpful. Chroma of a color is mostly related to its hue. Therefore, studies examining hue of color can easily guide studies which question chroma of color. Value of color is rarely mentioned in environmental psychology research. Thus, manipulations of the subject become complicated. Shopper may variously perceive value samples in different settlements, due to the fact; in future research should also elaborate this subject in other type of retail stores such as food products, hard goods or technological devices.

This study used manipulated versions of photographs of four existing retail stores. To take respondents to these existing retail stores and let them experience on-site could be effective for the perception of respondents. Although, simulations (manipulated samples) were found similar to real stores as has been mentioned before, mockups may be another option for respondents to observe retail environments as they are in that store.

During the questionnaire, respondents participated randomly in terms of quantitative manners. For instance, while one respondent was participating at one rating, five respondents participated in the study simultaneously. Such situations may cause biases since more than one respondent can express saliently his/her feelings which may direct feeling, thoughts and perception of other participants. Number of participants would be limited by some standardization which could be investigated in future research.

5.2. Directions for Future Research

To show samples serially, printouts were used during the study. Respondents of the pilot study suggested that value different samples should be shown successively in printouts. Using printouts gave an opportunity to achieve the most efficient and time saving presentation; however, color of manipulated samples on paper and on computer screen should match perfectly. To achieve uniformity in colors between printout and screen presentation, outputs were printed in CMYK color coding system and they were lightened up grey's midtones in Microsoft Office Picture Manager Program to get proper result like on computer screen. Using a computer screen could bring more accurate results. Unless the number of participants is controlled during questionnaire, using computer might slow down the process and respondents could refuse to join, because a proper view of computer screen is important. Angled views may affect perception of colors on screen and respondent should have a direct view of the screen. Since screen is flat, the sight out of its frame can be distorting to respondents. Therefore, the number of participants should be controlled to make this process proper and quicker.

Additionally, after having statistical data some results were postponed to analyze. For instance, crowdedness factor was excluded from further research, because it was loaded heavily. Gender differences on perception of store image could be examined in future research. This study evaluated neither gender nor age differences. Yıldırım et al. (2007), Valdez and Mehrabian (1994) found differences between genders and ages on perception; for instance, Yıldırım et al. asserted that perception differed according to gender and age when wavelength of color has changed in a restaurant.

Differences in retail store types, sizes or locations can lead to different results. Types of products determine retail store types. To reach the target group, arrangements and modifications in retail store environments can be made. A large, clothing store in midtown cannot be perceived similarly to a small, clothing store in uptown. Further, two different types of retail store with same atmospheric elements may be evaluated differently. Blue walls with white lighting in a supermarket may be too much for that environment while blue walls with white lighting in clothing store may be received positively than supermarket case. Future research needs to observe these differences: such categorizations on perception of store image can be achieved by well made comparisons.

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APPENDICES

APPENDIX A

Table A.1. Introduction Page

MAĞAZA ALGI ÇALIŞMASI

Bu çalışma mağaza imajlarının algısını incelemeye yöneliktir. Doğru veya yanlış cevap içermemektedir. Kimliğinizle ilgili bilgi istenmemektedir. Çalışmaya katılımınız tamamen isteğe bağlıdır.

Katkılarınız için teşekkür ederiz.

Anketle ilgili sorularınız için: Email: icagri@bilkent.edu.tr, seckin.sagiroglu@bilkent.edu.tr ; Tel: (312) 290 1519

1) Cinsiyetiniz: ☐ K ☐ E
2) Yaşınız: _____
3) Bölümünüz: _____
Lisans ☐ Yüksek Lisans (Master/Doktora) ☐

Sınıf _____

Örneğin, *"dar-geniş" boyutunda örnekte verilen mağaza size "oldukça geniş" geliyorsa 5 numaralı kutuyu işaretleyiniz.*

	Çok dar	***Oldukça Dar***	***Biraz dar***	***Biraz geniş***	***Oldukça Geniş***	***Çok geniş***	
Dar	1	2	3	4	(5)	6	Geniş

Table A.2. Questionnaire Form

1. FOTOĞRAF

A. AŞAĞIDA VERİLEN MAĞAZA ÖRNEKLERİNİ İNCELEYEREK SİZE HİSSETTİRDİĞİ DUYGU/DÜŞÜNCELERİ SIFAT ÇİFTLERİNE GÖRE DEĞERLENDİRİNİZ.

1.	Memnun kalmamış (Unsatisfied)	**1**	**2**	**3**	**4**	**5**	**6**	Memnun (Satisfied)
2.	Uyarılmış (Stimulated)	**1**	**2**	**3**	**4**	**5**	**6**	Rahatlamış (Relaxed)
3.	Kısıtlanmış (Restricted)	**1**	**2**	**3**	**4**	**5**	**6**	Serbest (Free)
4.	Mutsuz (Unhappy)	**1**	**2**	**3**	**4**	**5**	**6**	Mutlu (Happy)
5.	Sakin (Calm)	**1**	**2**	**3**	**4**	**5**	**6**	Heyecanlı (Excited)
6.	Gösterişsiz (Unattractive)	**1**	**2**	**3**	**4**	**5**	**6**	Göz alıcı (Attractive)
7.	Beğenmedim (Disliked)	**1**	**2**	**3**	**4**	**5**	**6**	Beğendim (Liked)

B. ÖRNEKLERDE GÖRDÜĞÜNÜZ MAĞAZALARI AŞAĞIDA VERİLEN SIFAT ÇİFTLERİNE GÖRE DEĞERLENDİRİNİZ.

1.	Olağan (Usual)	**1**	**2**	**3**	**4**	**5**	**6**	Şaşırtıcı (Surprising)
2.	Kalitesiz (Low quality)	**1**	**2**	**3**	**4**	**5**	**6**	Kaliteli (High quality)
3.	Kalabalık (Crowded)	**1**	**2**	**3**	**4**	**5**	**6**	Kalabalık olmayan (Uncrowded)
4.	Ucuz (Cheap)	**1**	**2**	**3**	**4**	**5**	**6**	Pahalı (Expensive)
5.	Eski moda (Old fashioned)	**1**	**2**	**3**	**4**	**5**	**6**	Modaya uygun (Fashionable)
6.	Soğuk (Cool)	**1**	**2**	**3**	**4**	**5**	**6**	Sıcak (Warm)

2. FOTOĞRAF

A. AŞAĞIDA VERİLEN MAĞAZA ÖRNEKLERİNİ İNCELEYEREK SİZE HİSSETTİRDİĞİ DUYGU/DÜŞÜNCELERİ SIFAT ÇİFTLERİNE GÖRE DEĞERLENDİRİNİZ.

1.	Memnun kalmamış (Unsatisfied)	**1**	**2**	**3**	**4**	**5**	**6**	Memnun (Satisfied)
2.	Uyarılmış (Stimulated)	**1**	**2**	**3**	**4**	**5**	**6**	Rahatlamış (Relaxed)
3.	Kısıtlanmış (Restricted)	**1**	**2**	**3**	**4**	**5**	**6**	Serbest (Free)
4.	Mutsuz (Unhappy)	**1**	**2**	**3**	**4**	**5**	**6**	Mutlu (Happy)
5.	Sakin (Calm)	**1**	**2**	**3**	**4**	**5**	**6**	Heyecanlı (Excited)
6.	Gösterişsiz (Unattractive)	**1**	**2**	**3**	**4**	**5**	**6**	Göz alıcı (Attractive)
7.	Beğenmedim (Disliked)	**1**	**2**	**3**	**4**	**5**	**6**	Beğendim (Liked)

B. ÖRNEKLERDE GÖRDÜĞÜNÜZ MAĞAZALARI AŞAĞIDA VERİLEN SIFAT ÇİFTLERİNE GÖRE DEĞERLENDİRİNİZ.

1.	Olağan (Usual)	**1**	**2**	**3**	**4**	**5**	**6**	Şaşırtıcı (Surprising)
2.	Kalitesiz (Low quality)	**1**	**2**	**3**	**4**	**5**	**6**	Kaliteli (High quality)
3.	Kalabalık (Crowded)	**1**	**2**	**3**	**4**	**5**	**6**	Kalabalık olmayan (Uncrowded)
4.	Ucuz (Cheap)	**1**	**2**	**3**	**4**	**5**	**6**	Pahalı (Expensive)
5.	Eski moda (Old fashioned)	**1**	**2**	**3**	**4**	**5**	**6**	Modaya uygun (Fashionable)
6.	Soğuk (Cool)	**1**	**2**	**3**	**4**	**5**	**6**	Sıcak (Warm)

APPENDIX B

Table B.1. The Results of Paired Samples T-Tests for Warmness-Coldness

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	CheckWarmness	3.6667	80	.72673	.08125
	CheckColdness	3.3104	80	.64943	.07261

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	CheckWarmness & CheckColdness	80	.281	.012

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	CheckWarmness - CheckColdness	.35625	.82751	.09252	.17210	.54040	3.851	79	.000

Table B.2. Factor Analysis

Rotated Component Matrix(a)

	Component		
	1	2	3
satisfALL	.881	.165	.131
likedALL	.768	.437	.136
happyALL	.755	.358	.209
attractALL	.744	.466	.077
relaxedALL	.728	.070	.288
SurprisingALL	.624	.482	-.277
freeALL	.612	.232	.581
excitedALL	.556	.306	-.132
FashionabALL	.166	.877	.223
ExpensiveALL	.251	.853	.228
HQualityALL	.378	.833	.076
WarmALL	.456	.597	.212
UnCrowdedALL	.061	.242	.856

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 7 iterations.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.160	55.080	55.080	7.160	55.080	55.080	4.538	34.911	34.911
2	1.312	10.094	65.174	1.312	10.094	65.174	3.555	27.342	62.253
3	1.106	8.506	73.680	1.106	8.506	73.680	1.486	11.427	73.680
4	.756	5.817	79.498						
5	.583	4.486	83.984						
6	.458	3.523	87.507						
7	.434	3.342	90.849						
8	.362	2.781	93.630						
9	.225	1.728	95.358						
10	.192	1.479	96.837						
11	.167	1.283	98.120						
12	.139	1.071	99.192						
13	.105	.808	100.000						

Extraction Method: Principal Component Analysis.

Table B.3. Reliability of the Rating Data

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.909	.908	7

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.923	.925	3

Table B.4. Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
F1mean	3.4789	.42156	80
F2mean	3.7063	.56245	80

Correlations

		F1mean	F2mean
F1mean	Pearson Correlation	1	.634(**)
	Sig. (2-tailed)		.000
	N	80	80
F2mean	Pearson Correlation	.634(**)	1
	Sig. (2-tailed)	.000	
	N	80	80

** Correlation is significant at the 0.01 level (2-tailed).

Table B.4. Correlations

Correlation Matrix

		satisfALL	relaxedALL	freeALL	happyALL	excitedALL	attractALL	likedALL	SurprisingALL	HQualityALL	UnCrowded ALL	ExpensiveALL	Fashionab ALL	WarmALL
Correlation	satisfALL	1.000	.663	.638	.695	.414	.753	.740	.571	.524	.187	.414	.356	.466
	relaxedALL	.663	1.000	.577	.516	.321	.495	.596	.407	.403	.225	.391	.336	.345
	freeALL	.638	.577	1.000	.661	.337	.545	.589	.351	.505	.475	.509	.436	.500
	happyALL	.695	.516	.661	1.000	.441	.710	.745	.607	.529	.299	.517	.475	.693
	excitedALL	.414	.321	.337	.441	1.000	.501	.488	.449	.420	.140	.331	.284	.440
	attractALL	.753	.495	.545	.710	.501	1.000	.853	.618	.672	.281	.557	.540	.592
	likedALL	.740	.596	.589	.745	.488	.853	1.000	.543	.668	.256	.595	.522	.633
	SurprisingALL	.571	.407	.351	.607	.449	.618	.543	1.000	.579	.032	.468	.454	.492
	HQualityALL	.524	.403	.505	.529	.420	.672	.668	.579	1.000	.262	.810	.798	.574
	UnCrowdedALL	.187	.225	.475	.299	.140	.281	.256	.032	.262	1.000	.341	.367	.352
	ExpensiveALL	.414	.391	.509	.517	.331	.557	.595	.468	.810	.341	1.000	.804	.626
	FashionabALL	.356	.336	.436	.475	.284	.540	.522	.454	.798	.367	.804	1.000	.550
	WarmALL	.466	.345	.500	.693	.440	.592	.633	.492	.574	.352	.626	.550	1.000
Sig. (1-tailed)	satisfALL		.000	.000	.000	.000	.000	.000	.000	.000	.048	.000	.001	.000
	relaxedALL	.000		.000	.000	.002	.000	.000	.000	.000	.023	.000	.001	.001
	freeALL	.000	.000		.000	.001	.000	.000	.001	.000	.000	.000	.000	.000
	happyALL	.000	.000	.000		.000	.000	.000	.000	.000	.004	.000	.000	.000
	excitedALL	.000	.002	.001	.000		.000	.000	.000	.000	.107	.001	.005	.000
	attractALL	.000	.000	.000	.000	.000		.000	.000	.000	.006	.000	.000	.000
	likedALL	.000	.000	.000	.000	.000	.000		.000	.000	.011	.000	.000	.000
	SurprisingALL	.000	.000	.001	.000	.000	.000	.000		.000	.391	.000	.000	.000
	HQualityALL	.000	.000	.000	.000	.000	.000	.000	.000		.009	.000	.000	.000
	UnCrowdedALL	.048	.023	.000	.004	.107	.006	.011	.391	.009		.001	.000	.001
	ExpensiveALL	.000	.000	.000	.000	.001	.000	.000	.000	.000	.001		.000	.000
	FashionabALL	.001	.001	.000	.000	.005	.000	.000	.000	.000	.000	.000		.000
	WarmALL	.000	.001	.000	.000	.000	.000	.000	.000	.000	.001	.000	.000	

Table B.5. T-Tests of Cold- Warm and All Pairs

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	F1P1red1	3.5786	80	.86282	.09647
	F1P3red0	3.4464	80	1.00897	.11281
Pair 2	F1P2red2	3.2839	80	1.05628	.11810
	F1P3red0	3.4464	80	1.00897	.11281
Pair 3	F1P4yellow1	3.8482	80	.91666	.10249
	F1P6yellow0	3.6196	80	.93965	.10506
Pair 4	F1P5yellow2	2.9768	80	.99610	.11137
	F1P6yellow0	3.6196	80	.93965	.10506
Pair 5	F1P7green1	3.3357	80	.93113	.10410
	F1P9green0	3.6339	80	1.00960	.11288
Pair 6	F1P8green2	3.0482	80	1.07145	.11979
	F1P9green0	3.6339	80	1.00960	.11288
Pair 7	F1P10blue1	3.8357	80	1.07365	.12004
	F1P12blue0	3.7786	80	1.10444	.12348
Pair 8	F1P11blue2	3.3607	80	.98398	.11001
	F1P12blue0	3.7786	80	1.10444	.12348
Pair 9	F2P1red1	3.8042	80	.93636	.10469
	F2P3red0	3.5833	80	1.06008	.11852
Pair 10	F2P2red2	3.5792	80	1.17372	.13123
	F2P3red0	3.5833	80	1.06008	.11852
Pair 11	F2P4yellow1	3.9500	80	.96215	.10757
	F2P6yellow0	3.9292	80	1.05768	.11825
Pair 12	F2P5yellow2	3.2250	80	1.05646	.11812
	F2P6yellow0	3.9292	80	1.05768	.11825
Pair 13	F2P7green1	3.6458	80	1.09512	.12244
	F2P9green0	4.1500	80	1.03239	.11542
Pair 14	F2P8green2	3.3458	80	1.12938	.12627
	F2P9green0	4.1500	80	1.03239	.11542
Pair 15	F2P10blue1	3.8500	80	1.16670	.13044
	F2P12blue0	3.8500	80	1.26168	.14106
Pair 16	F2P11blue2	3.5625	80	1.09415	.12233
	F2P12blue0	3.8500	80	1.26168	.14106
Pair 17	F1P1red1	3.5786	80	.86282	.09647
	F1P2red2	3.2839	80	1.05628	.11810
Pair 18	F1P4yellow1	3.8482	80	.91666	.10249
	F1P5yellow2	2.9768	80	.99610	.11137
Pair 19	F1P7green1	3.3357	80	.93113	.10410
	F1P8green2	3.0482	80	1.07145	.11979
Pair 20	F1P10blue1	3.8357	80	1.07365	.12004
	F1P11blue2	3.3607	80	.98398	.11001
Pair 21	F2P1red1	3.8042	80	.93636	.10469
	F2P2red2	3.5792	80	1.17372	.13123
Pair 22	F2P4yellow1	3.9500	80	.96215	.10757
	F2P5yellow2	3.2250	80	1.05646	.11812
Pair 23	F2P7green1	3.6458	80	1.09512	.12244
	F2P8green2	3.3458	80	1.12938	.12627
Pair 24	F2P10blue1	3.8500	80	1.16670	.13044
	F2P11blue2	3.5625	80	1.09415	.12233

Table B.5. T-Tests of Cold- Warm and All Pairs

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	F1P1red1 & F1P3red0	80	.219	.051
Pair 2	F1P2red2 & F1P3red0	80	.126	.266
Pair 3	F1P4yellow1 & F1P6yellow0	80	.229	.041
Pair 4	F1P5yellow2 & F1P6yellow0	80	-.156	.167
Pair 5	F1P7green1 & F1P9green0	80	.582	.000
Pair 6	F1P8green2 & F1P9green0	80	.347	.002
Pair 7	F1P10blue1 & F1P12blue0	80	.360	.001
Pair 8	F1P11blue2 & F1P12blue0	80	.146	.198
Pair 9	F2P1red1 & F2P3red0	80	.267	.017
Pair 10	F2P2red2 & F2P3red0	80	.083	.462
Pair 11	F2P4yellow1 & F2P6yellow0	80	.251	.025
Pair 12	F2P5yellow2 & F2P6yellow0	80	.018	.873
Pair 13	F2P7green1 & F2P9green0	80	.350	.001
Pair 14	F2P8green2 & F2P9green0	80	.155	.169
Pair 15	F2P10blue1 & F2P12blue0	80	.479	.000
Pair 16	F2P11blue2 & F2P12blue0	80	.231	.039
Pair 17	F1P1red1 & F1P2red2	80	.055	.628
Pair 18	F1P4yellow1 & F1P5yellow2	80	-.126	.266
Pair 19	F1P7green1 & F1P8green2	80	.203	.071
Pair 20	F1P10blue1 & F1P11blue2	80	.181	.109
Pair 21	F2P1red1 & F2P2red2	80	.285	.010
Pair 22	F2P4yellow1 & F2P5yellow2	80	.216	.054
Pair 23	F2P7green1 & F2P8green2	80	.258	.021
Pair 24	F2P10blue1 & F2P11blue2	80	.308	.005

Table B.5. T-Tests of Cold- Warm and All Pairs

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	F1P1red1 - F1P3red0	.13214	1.17513	.13138	-.12937	.39365	1.006	79	.318
Pair 2	F1P2red2 - F1P3red0	-.16250	1.36585	.15271	-.46645	.14145	-1.064	79	.291
Pair 3	F1P4yellow1 - F1P6yellow0	.22857	1.15267	.12887	-.02794	.48509	1.774	79	.080
Pair 4	F1P5yellow2 - F1P6yellow0	-.64286	1.47203	.16458	-.97044	-.31527	-3.906	79	.000
Pair 5	F1P7green1 - F1P9green0	-.29821	.89031	.09954	-.49634	-.10008	-2.996	79	.004
Pair 6	F1P8green2 - F1P9green0	-.58571	1.19038	.13309	-.85062	-.32081	-4.401	79	.000
Pair 7	F1P10blue1 - F1P12blue0	.05714	1.23281	.13783	-.21720	.33149	.415	79	.680
Pair 8	F1P11blue2 - F1P12blue0	-.41786	1.36812	.15296	-.72232	-.11340	-2.732	79	.008
Pair 9	F2P1red1 - F2P3red0	.22083	1.21285	.13560	-.04907	.49074	1.629	79	.107
Pair 10	F2P2red2 - F2P3red0	-.00417	1.51457	.16933	-.34122	.33289	-.025	79	.980
Pair 11	F2P4yellow1 - F2P6yellow0	.02083	1.23856	.13847	-.25479	.29646	.150	79	.881
Pair 12	F2P5yellow2 - F2P6yellow0	-.70417	1.48124	.16561	-1.03380	-.37453	-4.252	79	.000
Pair 13	F2P7green1 - F2P9green0	-.50417	1.21407	.13574	-.77434	-.23399	-3.714	79	.000
Pair 14	F2P8green2 - F2P9green0	-.80417	1.40693	.15730	-1.11726	-.49107	-5.112	79	.000
Pair 15	F2P10blue1 - F2P12blue0	.00000	1.24157	.13881	-.27630	.27630	.000	79	1.000
Pair 16	F2P11blue2 - F2P12blue0	-.28750	1.46669	.16398	-.61390	.03890	-1.753	79	.083
Pair 17	F1P1red1 - F1P2red2	.29464	1.32662	.14832	-.00058	.58987	1.987	79	.050
Pair 18	F1P4yellow1 - F1P5yellow2	.87143	1.43607	.16056	.55185	1.19101	5.428	79	.000
Pair 19	F1P7green1 - F1P8green2	.28750	1.26872	.14185	.00516	.56984	2.027	79	.046
Pair 20	F1P10blue1 - F1P11blue2	.47500	1.31870	.14744	.18154	.76846	3.222	79	.002
Pair 21	F2P1red1 - F2P2red2	.22500	1.27595	.14266	-.05895	.50895	1.577	79	.119
Pair 22	F2P4yellow1 - F2P5yellow2	.72500	1.26599	.14154	.44327	1.00673	5.122	79	.000
Pair 23	F2P7green1 - F2P8green2	.30000	1.35489	.15148	-.00152	.60152	1.980	79	.051
Pair 24	F2P10blue1 - F2P11blue2	.28750	1.33095	.14880	-.00869	.58369	1.932	79	.057